

**Translation**

**PATENT COOPERATION TREATY**

**PCT**

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>SA 5348-02WO</b>	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. <b>PCT/EP2004/003297</b>	International filing date (day/month/year) <b>29.03.2004</b>	Priority date (day/month/year) <b>07.05.2003</b>
International Patent Classification (IPC) or national classification and IPC		
Applicant <b>SENNHEISER ELECTRONIC GMBH &amp; CO. KG</b>		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 12 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

a. ☒ (sent to the applicant and to the International Bureau) a total of 2 sheets, as follows:

☒ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) \_\_\_\_\_, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

<input checked="" type="checkbox"/>	Box No. I	Basis of the report
<input type="checkbox"/>	Box No. II	Priority
<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/>	Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/>	Box No. VI	Certain documents cited
<input type="checkbox"/>	Box No. VII	Certain defects in the international application
<input checked="" type="checkbox"/>	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

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Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language \_\_\_\_\_ which is the language of a translation furnished for the purposes of:

- ☐ international search (Rule 12.3 and 23.1(b))  
☐ publication of the international application (Rule 12.4)  
☐ international preliminary examination (Rule 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

☐ the international application as originally filed/furnished

☒ the description:

pages 1-9 as originally filed/furnished

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

☒ the claims:

nos. \_\_\_\_\_ as originally filed/furnished

nos.\* \_\_\_\_\_ as amended (together with any statement) under Article 19

nos.\* 1-5 received by this Authority on /filed with the demand

nos.\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

☒ the drawings:

sheets 1/2, 2/2 as originally filed/furnished

sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☒ The amendments have resulted in the cancellation of:

☐ the description, pages \_\_\_\_\_

☒ the claims, nos. 6, 7

☐ the drawings, sheets/figs \_\_\_\_\_

☐ the sequence listing (*specify*): \_\_\_\_\_

☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages \_\_\_\_\_

☐ the claims, nos. \_\_\_\_\_

☐ the drawings, sheets/figs \_\_\_\_\_

☐ the sequence listing (*specify*): \_\_\_\_\_

☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

## 1. Statement

Novelty (N)	Claims <u>1-5</u>	YES
	Claims _____	NO
Inventive step (IS)	Claims _____	YES
	Claims <u>1-5</u>	NO
Industrial applicability (IA)	Claims <u>1-5</u>	YES
	Claims _____	NO

## 2. Citations and explanations (Rule 70.7)

**1) PRIOR ART (PCT Rule 64.1) :**

1.1 This report makes reference to the following documents:

D1: US 5 255 326 A (STEVENSON ALDEN) 19 October 1993 (1993-10-19)

D2: US 6 219 645 B1 (BYERS CHARLES CALVIN) 17 April 2001 (2001-04-17)

D3: US 5 400 409 A (LINHARD KLAUS) 21 March 1995 (1995-03-21)

1.2 Document D1 (see figure 1 and the corresponding part of the description) discloses (the references between parentheses refer to that document):

a system for the location-sensitive reproduction of audio signals, using electroacoustic transducers ("stereophonic speaker units", see column 3, lines 3 - 5), comprising an infrared location-sensitive detection device for detecting the position of the person listening (10, see column 3, lines 28 - 35) and a central processing

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unit ("signal processor" 12) for calculating and controlling the audio signal output from the individual transducers for optimum reproduction of the audio signals at the position of the person listening, detected by the detection device (see column 3, lines 18 - 47 and column 2, lines 23 - 28).

In D1, the loudspeakers are combined with the sensors (18, 22) to produce a single unit (see figure 1, reference signs 14 and 16 and column 3, lines 3 - 12). Figure 1 suggests integrating the unit in a housing.

The loudspeakers may also be used as microphones, that is as receivers for the audio signals (see column 3, lines 6 - 13). In that configuration, the microprocessor processes the acoustic signals received by the transducers ("voice commands", see column 3, lines 48 - 64) and the signals from the location-sensitive detection devices (see column 3, line 65 - column 4, line 4). The system according to document D1 can therefore be controlled by means of voice recognition. In addition, the playback loudspeakers can be used as microphones for the acoustic triangulation, in addition to or instead of the infrared location-sensitive detection device for detecting the position of the person listening.

- 1.3 Document D2 describes voice-controlled audio reproduction devices ("entertainment systems", see

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	<p>column 1, line 27; "television device", see column 4, line 14), in which the position of the user is determined using voice recognition signals (see figure 3, step 320 and column 7, lines 39 - 48). Document D2 looks in detail at the question of how such devices can be controlled without errors when a plurality of microphones are used, the danger existing of a voice command that is received by a plurality of microphones being incorrectly responded to by a plurality of devices (see column 2, lines 23 - 36).</p> <p>Document D2 proposes correlating the signals of all the microphones so as to determine the position of the user by means of triangulation (column 13, line 6 - column 14, line 2 and column 5, lines 20 - 28) and finding the microphone that is nearest to the user (see column 7, lines 39 - 48 and column 13, lines 31 - 35). Proceeding therefrom, and incorporating other information, the signal with the best voice quality is then used for voice recognition (step 350 in figure 3; see also column 8, lines 21 - 28 and column 5, lines 21 - 35), thereby ensuring error-free voice recognition.</p> <p>1.4 Document D3 discloses an in-phase or transit time-corrected addition of the signals received by a plurality of microphones in order to improve the ability to recognise commands during voice recognition (column 1, lines 24 - 33).</p>

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2)	<b>NOVELTY (PCT Article 33(2)):</b>  2.1 The claimed system differs from that known from document D1 in that owing to the fact that the central processing unit is configured to correlate the second audio signals received by the microphones and the position information from the location-sensitive detection devices, it is also configured for the location-sensitive receiving of audio signals, and in that each unit is disposed in a housing.  2.2 The claimed system differs from that known from document D2 in that it is also configured for the location-sensitive reproduction of audio signals and in that each unit is disposed in a housing.  2.3 The claimed system differs from that known from document D3 in that it is configured for the location-sensitive receiving and reproduction of audio signals and in that each unit is disposed in a housing.  2.4 The other documents listed in the international search report are in part of similar relevance as document D1 or also document D2. However, they are no closer than documents D1 and D2. The claimed system is therefore novel (PCT Article 33(2)).

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<b>3)</b>	<p><b>INVENTIVE STEP (PCT Article 33(3)):</b></p> <p>3.1 Document D1 is considered the closest prior art. As mentioned above, according to document D1 the loudspeakers can also be used as microphones, as is the case in the current international application (page 5, lines 28 - 30). In document D1, the microprocessor processes the acoustic signals received by the transducers ("voice commands"; see column 3, lines 48 - 64) and the signals from the location-sensitive detection devices (see column 3, line 65 - column 4, line 4). The system according to document D1 can therefore be controlled by means of voice recognition and can determine the position of the listener by means of acoustic triangulation.</p> <p>3.2 The non-specific "correlation" of the second audio signals received by the microphones or loudspeakers with the position information signals from the location-sensitive detection devices as per claim 1 thus solves the objective problem during voice recognition of being able to select those voice recognition signals which are most suitable for recognition of the acoustic signals (because the distance between the listener and the particular microphone or loudspeaker is the shortest).</p> <p>This problem is obvious in the field of voice recognition (see, for example, document D2, column 2, lines 19 - 22). Recognition of the</p>

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problem alone therefore does not involve an inventive step.

3.3 Consequently, proceeding from document D1, a person skilled in the art would be faced with the problem of guaranteeing voice recognition that is as error-free as possible from the two acoustic voice recognition signals that are received by the loudspeakers (14, 16). An obvious potential source of error lies in the fact that each of the two voice recognition signals impairs the other.

3.4 Another document which describes voice-controlled audio reproduction devices ("entertainment systems", see column 1, line 27; "television device", see column 4, line 14) and in which the position of the user is located using voice recognition signals (see figure 3, step 320 and column 7, lines 39 - 48) is document D2. Document D2 looks in detail at the question of how such devices can be controlled without errors when a plurality of microphones are used, the danger existing of a voice command that is received by a plurality of microphones being incorrectly responded to by a plurality of devices (see column 2, lines 23 - 36).

Proceeding from document D1 and owing to the similar problems of interest, a person skilled in the art would consult document D2 and would find therein approaches for solving the problem of error-free voice recognition. Document D2



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proposes correlating the signals of all the microphones so as to determine the position of the user by means of triangulation (column 13, line 6 - column 14, line 2 and column 5, lines 20 - 28) and finding the microphone that is nearest to the user (see column 7, lines 39 - 48 and column 13, lines 31 - 35). Proceeding therefrom, and incorporating other information, the signal with the best voice quality is then used for voice recognition (step 350 in figure 3; see also column 8, lines 21 - 28 and column 5, lines 21 - 35), thereby ensuring error-free voice recognition.

The applicant should note that in document D2 also the microphones are used for both voice recognition and for locating position.

A person skilled in the art, proceeding from document D1, would therefore solve the problem of interest by using the technical measures proposed in document D2 and would thereby arrive largely at the subject matter of claim 1.

- 3.5 The further distinguishing feature in claim 1, that is the housing enclosing the loudspeakers, the microphone and the location-sensitive detection device, is suggested by figure 1 of document D1 and by the fact that the electroacoustic transducer can assume all three functions (as loudspeaker and microphone, as in document D1 and the current application, and as

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	<p>microphone and location-sensitive detection device, as in document D2). Furthermore, this further distinguishing feature is in general not functionally linked to the first distinguishing feature (correlation of the microphone signals and the location signals) and therefore the claim contains a combination of obvious features (as in example (c) in section 13.14 of the PCT Guidelines).</p> <p>3.6 Consequently, the system according to <b>claim 1</b> does not involve an inventive step (PCT Article 33(3)).</p> <p>3.7 According to document D1, the control of the loudspeakers is adjusted in line with the momentary position of the listener in real time (see column 3, lines 40 - 47). Consequently, the system according to <b>claim 2</b> also does not involve an inventive step (PCT Article 33(3)).</p> <p>3.8 It is also known from document D2 that the microphone with the best signal-to-noise ratio may be the most suitable (see column 5, lines 25 - 28). Consequently, the system according to <b>claim 3</b> also does not involve an inventive step (PCT Article 33(3)).</p> <p>3.9 In both documents D1 and D2 the microphones and the location-sensitive detection devices are spatially distributed (see figure 1 of each document). Consequently, the system according to <b>claim 4</b> also does not involve an inventive step</p>

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(PCT Article 33(3)).

- 3.10 The in-phase or transit time-corrected addition of the signals received by a plurality of microphones, as per claim 7, is a known measure for improving the ability to recognise commands during voice recognition; see document D3 (column 1, lines 24 - 33). Consequently, the system according to **claim 5** also does not involve an inventive step (PCT Article 33(3)).

**4) INDUSTRIAL APPLICABILITY (PCT Article 33(4)):**

- 4.1 The system according to claims 1 - 5 is clearly industrially applicable (PCT Article 33(4)).

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**Box No. VIII**      **Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

The first embodiment is not covered by claim 1,  
since no correlation in the sense of the claim is  
included therein (PCT Article 6; PCT Guidelines,  
5.29) .